AutoCAD 2025 Tutorial Second Level 3D Modeling



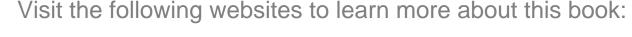










Table of Contents

Preface Acknowledgments

Introduction	n
Getting	Started

Introduction	Intro-2
Development of Computer Geometric Modeling	Intro-2
Why Use AutoCAD 2025?	Intro-5
Getting Started with AutoCAD 2025	Intro-7
AutoCAD 2025 Screen Layout	Intro-8
Application Menu	Intro-9
Quick Access Toolbar	Intro-9
AutoCAD Menu Bar	Intro-9
Layout Tabs	Intro-9
Drawing Area	Intro-10
Graphics Cursor or Crosshairs	Intro-10
Command Prompt Area	Intro-10
Cursor Coordinates	Intro-10
Status Toolbar	Intro-10
Ribbon Tabs and Panels	Intro-11
Draw and Modify Toolbar Panels	Intro-11
Layers Control Toolbar Panel	Intro-11
Viewport/View/Display Controls	Intro-11
Mouse Buttons	Intro-12
[Esc] - Canceling commands	Intro-12
Online Help	Intro-13
Leaving AutoCAD 2025	Intro-14
Creating a CAD File Folder	Intro-14

Chapter 1 User Coordinate Systems and the Z-Axis

Introduction	1-2
The Floor Plan Design	1-2
Starting Up AutoCAD 2025	1-3
3D Basic Modeling WorkSpace	1-4
Drawing Units Setup	1-5
Drawing Area Setup	1-6
Grid and Snap Intervals Setup	1-7
Create Polylines	1-9
Create an Offset Polyline	1-10
Create Interior Walls	1-11

Complete the Doorway Using the Trim Command User Coordinate System – It is an XY CRT, but an XYZ World Viewing the 2D Design in 3D Space Add the 3rd Dimension to the Floor Plan Design View the Design Using the Hide Option Add New Layers Move Entities to a Different Layer Reposition the UCS Create the Roof Rotating the UCS Sketching on the Rotated UCS View the Design Using the Hidden Option Review Questions Exercises	1-14 1-16 1-17 1-18 1-20 1-21 1-23 1-23 1-25 1-27 1-28 1-29 1-30 1-31
Chapter 2 3D Wireframe Modeling	
Introduction The Locator Design Starting Up AutoCAD 2025 Activate the Startup Option Create the Rectangular Base of the Design Create a 3D Box Object Snap Toolbar Use the Snap Options to Locate the Top Corners Use the Copy Option to Create Additional Edges Use the Trim Command Use the View Toolbar Dynamic Rotation – Free Orbit Use the Offset Command to Create Parallel Edges Create a Circle above the UCS Sketch Plane Complete the Wireframe Model Review Questions Exercises	2-2 2-3 2-4 2-4 2-6 2-7 2-10 2-12 2-14 2-16 2-16 2-17 2-19 2-20 2-22 2-23
Chapter 3 UCS, Viewports and Wireframe Modeling	
Introduction The V-Block Design Starting Up AutoCAD 2025 3D Modeling Workspace Layers Setup Create the Rectangular Base of the Design Create a Wireframe Box	3-2 3-2 3-3 3-3 3-4 3-5 3-6

Using the View and UCS Toolbars Create Construction Lines in the Front View Copy Objects in the Negative Z Direction Create an Inclined Line at the Base of the Model Create Object Lines Multiple Viewports Use the Mirror Command Turn Off the Construction Lines Create a New UCS Create a New UCS Create a New Named View Create the V-Cut Feature on the Inclined Plane Extend the Cut and GRIP Editing Review Questions Exercises	3-7 3-8 3-10 3-11 3-12 3-14 3-15 3-17 3-18 3-20 3-22 3-23 3-25 3-26
Chapter 4 Classical Faceted Surface Modeling	
Introduction Starting Up AutoCAD 2025 The UCS Toolbar and the Meshes Commands Create a Mesh Surface Using the 2D Solid Command Using the Visual Styles Toolbar Create a Mesh Surface Using the 3D Face Command The ViewCube Create a Faceted Surface of Irregular Shape Use the Invisible Edge Option Repositioning with the Grip Editing Tools The Locator Wireframe Model Moving Objects to a Different Layer Advanced Meshed Surface Modeling Commands Use the Faceted Tabulated Surface Option Use the Faceted Ruled Surface Option Review Questions Exercises	4-2 4-4 4-5 4-5 4-8 4-10 4-12 4-14 4-16 4-17 4-18 4-20 4-23 4-24 4-27 4-28
Chapter 5 Procedural and NURBS Surface Modeling	
Introduction Starting Up AutoCAD 2025 Turn on the UCS II Toolbar Layers Setup Create a Thin Surface Using the Extrude Command Create another Profile Complete the Profile Using Object Snap	5-2 5-3 5-3 5-4 5-5 5-8 5-9

Create another Thin Surface Using the Extrude Command	5-11
Create a Flat Planar Surface	5-13
Use the Trim option to adjust the Top Surface	5-14
Create another Planar Surface	5-16
Use the Trim option to adjust the New Surface	5-17
Combining two Overlapping Surfaces	5-19
Create a 3D Free Form NURBS Surface Model	5-21
AutoCAD Spline Curves	5-22
Start a New Drawing and Layers Setup	5-23
Create Two sets of Splines	5-24
Display the Control Vertices and Edit the Splines	5-28
Create a Network Surface	5-29
Convert the Network surface to a NURBS surface	5-31
Review Questions	5-32
Exercises	5-33
Chapter 6 Solid Modeling Constructive Solid Constructive	
Solid Modeling - Constructive Solid Geometry	
Introduction	6-2
The Guide-Block Design	6-2
Constructive Solid Geometry Concept	6-3
Binary Tree	6-4
The Guide-Block CSG Binary Tree	6-5
Starting Up AutoCAD 2025	6-6
Layers Setup	6-7
Create the First 3D Object	6-7
Create the Second Solid Feature	6-9
Boolean Operation - Union	6-10
Create the Second Cylinder Feature	6-11
Boolean Operation - Subtract	6-12
Create another Solid Feature	6-13
Visual Styles Options	6-14
Create the Final Feature	6-15
Rotating the Rectangular Block	6-16
Reposition the Rectangular Block	6-17
The SteeringWheels	6-18
Review Questions	6-20
Exercises	6-21
Chapter 7 Pagions Extrude and Solid Modeling	
Regions, Extrude and Solid Modeling	
Introduction	7-2
The V-Block-Solid Design	7-2
Starting Up AutoCAD 2025	7-3

Layers Setup Setting Up a 2D Sketch Defining the Front Edges of the Design Create a Region Extruding the Created Region Create a 2D Sketch at the Base of the Model Create a Mirrored Copy of the 2D Sketch Create the Cutter Solids Boolean Operation - Subtract Mass Properties of the Solid Model Align the UCS to the Inclined Face Create the V-Cut Review Questions Exercises	7-4 7-5 7-7 7-10 7-11 7-13 7-14 7-15 7-16 7-17 7-18 7-19 7-22 7-23
Chapter 8 Symmetrical Features in Designs	
Introduction A Revolved Design: Pulley Modeling Strategy - A Revolved Design Starting Up AutoCAD 2025 Layers Setup Set Up a 2D Sketch for the Revolved Feature Perform 2D Boolean Operations Create the Revolved Feature Mirrored Image of the Part Combine Two Parts into One Use the 3D Array Command Position and Perform the Cut Review Questions Exercises	8-2 8-2 8-3 8-4 8-5 8-6 8-8 8-12 8-13 8-14 8-15 8-18 8-20 8-21
Chapter 9 Multiview Drawings from 3D Models	
Introduction The V-Block Design Starting Up AutoCAD 2025 AutoCAD Paper Space Delete the Displayed Viewport Add Borders and Title Block in the Layout Setting Up the Standard Views Determine the Necessary 2D Views Establish an Auxiliary View	9-2 9-2 9-3 9-4 9-5 9-6 9-7 9-9

Complete the 2D Drawing Open the Pulley Solid Model AutoCAD Paper Space setup Delete the Displayed Viewport Add Borders and Title Block by Copy & Paste Setting Up the Standard Views Determine the Necessary 2D Views Rotate the Base View Establish a Section View Adjust the Scale of the Base View Add an Isometric View Complete the 2D Drawing Review Questions Exercises	9-14 9-15 9-16 9-17 9-17 9-19 9-21 9-22 9-23 9-26 9-27 9-28 9-29 9-30
Chapter 10 Advanced Modeling Tools & Techniques	
Introduction A Thin-Walled Design: Oil Sink Modeling Strategy Starting Up AutoCAD 2025 Layers Setup The First Extruded Feature Create an Offset Geometry from an Extracted Surface Extrude with Draft Angle Align the Parts Create another Extracted Surface Combining Parts – Boolean Union Create 3D Rounds and Fillets Create a Shell Feature Create a Rectangular Array Cut Feature Create another Rectangular Array Cut Feature Making a Design Change Grip Editing Approach Dynamic UCS Approach Review Questions Exercises	10-2 10-3 10-4 10-5 10-6 10-8 10-10 10-11 10-12 10-15 10-16 10-18 10-19 10-21 10-23 10-23 10-24 10-27 10-28
Chapter 11 Conceptual Design Tools & Techniques	
Introduction A Bird House Design Starting Up AutoCAD 2025 Layers Setup	11-2 11-3 11-4 11-5

The Base Plate Create the Compartments for the 1 st Floor Using the Press/Pull Command	11-6 11-7 11-8
Using the Press/Pull Command as an Editing Tool	11-10
Create another Cut Feature	11-11
Adjust the Compartments	11-13
Add Additional Compartments	11-14
Create the Doors	11-15
Create the 2 nd Floor	11-16
Reposition the 2 nd Floor	11-18
Modeling the Roof Section with the Press/Pull Command	11-19
Use the Imprint Command	11-21
Review Questions	11-24
Exercises	11-25
Chapter 12 Introduction to Photorealistic Rendering	
•	
Introduction	12.2
Introduction Start Lin AutoCAD 2025 and Patriove the Pulley Design	12-2
Start Up AutoCAD 2025 and Retrieve the Pulley Design	12-3
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup	12-3 12-4
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command	12-3 12-4 12-7
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD	12-3 12-4 12-7 12-8
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options	12-3 12-4 12-7 12-8 12-9
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option	12-3 12-4 12-7 12-8 12-9 12-11
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls	12-3 12-4 12-7 12-8 12-9 12-11 12-14
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls Create a Point Light	12-3 12-4 12-7 12-8 12-9 12-11
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls Create a Point Light Changing the Applied Materials	12-3 12-4 12-7 12-8 12-9 12-11 12-14 12-17
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls Create a Point Light Changing the Applied Materials Create a Spotlight	12-3 12-4 12-7 12-8 12-9 12-11 12-14 12-17 12-19
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls Create a Point Light Changing the Applied Materials	12-3 12-4 12-7 12-8 12-9 12-11 12-14 12-17 12-19 12-20
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls Create a Point Light Changing the Applied Materials Create a Spotlight Removing a Light	12-3 12-4 12-7 12-8 12-9 12-11 12-14 12-17 12-19 12-20 12-22
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls Create a Point Light Changing the Applied Materials Create a Spotlight Removing a Light Create a Distant Light	12-3 12-4 12-7 12-8 12-9 12-11 12-14 12-17 12-19 12-20 12-22 12-23
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls Create a Point Light Changing the Applied Materials Create a Spotlight Removing a Light Create a Distant Light Create New Materials Save the Rendered Images Conclusion	12-3 12-4 12-7 12-8 12-9 12-11 12-14 12-17 12-19 12-20 12-22 12-23 12-23
Start Up AutoCAD 2025 and Retrieve the Pulley Design Environment Setup Use the Render Command Available Lighting Simulation Modes in AutoCAD Use the Materials Options Activate the Sun & Sky Background Option Add Additional Walls Create a Point Light Changing the Applied Materials Create a Spotlight Removing a Light Create a Distant Light Create New Materials Save the Rendered Images	12-3 12-4 12-7 12-8 12-9 12-11 12-14 12-17 12-19 12-20 12-22 12-23 12-26 12-29

Index